GLOBAL LIVESTOCK CRSP

Fuelwood Gathering and Use in Northern Kenya: Implications for Food Aid and Local Environments

John McPeak, Syracuse University
Pastoral Risk Management Project

Research Brief 03-01-PARIMA May 2003

As pastoral populations settle, there is concern about environmental impacts of sedentarization. In particular, fuelwood gathering can place intense pressure on local woody vegetation. We report preliminary findings from surveys of 87 pastoral households from three communities in northern Kenya conducted during 2000. The objective was to characterize harvest and use of fuelwood resources. Households used approximately 19 kg of wood daily (largely Acacia spp.). Most wood was used to cook maize. Comparison with findings from an earlier study suggests household daily fuelwood use is increasing in this area. Human dietary shifts associated with increased market involvement and increased provision of food aid —namely moving from milk-dominated to maize-dominated diets— is hypothesized to explain this increase. Experiments were conducted in 2002 to assess amounts of wood needed to cook whole-grain maize versus maize flour, as food aid is distributed as whole-grain maize. Results indicated that twice as much wood was needed to cook whole-grain maize, suggesting that milling food aid prior to distribution could reduce demand for fuel, lower women's labor, and mitigate pressure on woody species. Findings suggest alternatives such as distribution of milled food aid and other efforts will be needed to reduce demand for fuelwood.

Background

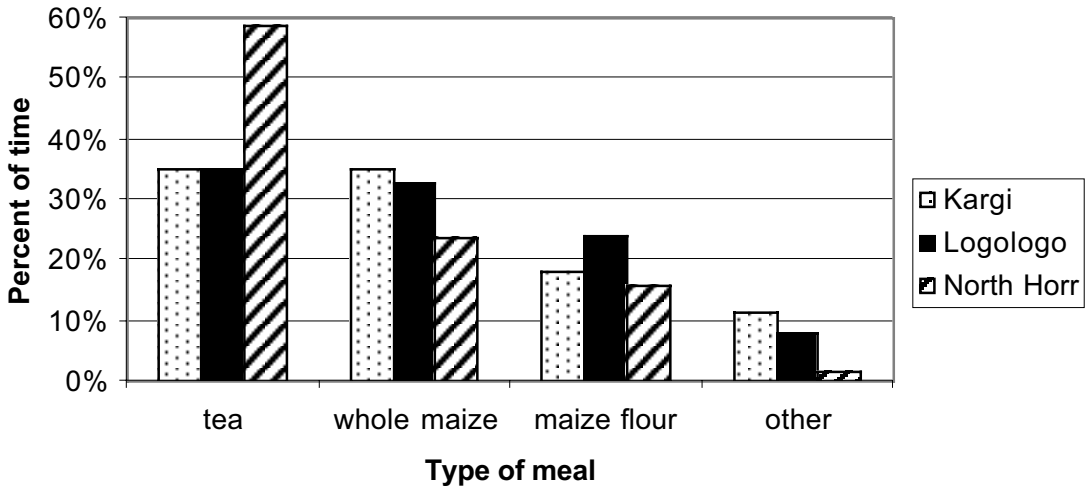
Many researchers in northern Kenya have noted the process by which formerly nomadic populations become settled (Sobania, 1979; O'Leary, 1987; Legesse, 1989; Fratkin, 1991; McPeak and Little, in press). These observers have commented on the rapid growth of small towns in northern Kenya over the past 40 years. The growth of these settlements has led to concern about pressure placed on natural resources surrounding these towns (Walther and Herlocker, 1983; Lusigi, 1984; Keya, 1998). This study was designed to investigate a particular aspect of natural resource exploitation, namely the collection and use of fuelwood for cooking in arid and semi-arid areas. Three of the most arid research sites used by the Pastoral Risk Management (PARIMA) project were selected for this study: Kargi, North Horr, and Logologo. Eighty-seven households participating in an on-going survey to assess socioeconomic dynamics were also interviewed for this fuelwood study during July and August 2000 (the dry season). Each household was visited over seven consecutive days. A total of 608 observations (per household per day) were obtained. The survey recorded information about fuelwood gathering and use. A separate component of this study was conducted in 2002. It involved an experiment to contrast the fuelwood requirements of cooking whole-grain maize versus that for maize flour. A subset of sampled households was monitored for details on cooking various forms of maize. Information on cooking time and fuelwood use was recorded. There are 20 paired cooking observations in the analysis.

Preliminary Findings

- Of 238 fuelwood gathering trips recorded, only one was undertaken by a male. Fuelwood gathering is thus an activity of female adults and children.
- Fuelwood gathering took place about once every three days on average. The average trip took three hours.
- People carried wood back home themselves 98% of the time. Camels and donkeys were used for the scant remainder. Wood gathering was dominated by use of machetes (60% of trips), breaking wood by hand (37%), or using an axe (3%). About 1.6 woody species and 48 pieces of wood were gathered per trip.
- *Acacia* species (primarily *A. reficiens, A. seyal, A. tortilis,* and *A. mellifera*) accounted for 57% of wood gathered. The next most common genera was *Suaeda* (*S. monoica* is gathered exclusively by North Horr area residents), accounting for 11% of all wood gathered. A variety of other species made up the remainder.

Global Livestock Collaborative Research Support Program
University of California - Davis ■ 258 Hunt Hall ■ Davis, California 95616 USA
Phone 530-752-1721 ■ Fax 530-752-7523 ■ E-Mail glcrsp@ucdavis.edu ■ Web glcrsp.ucdavis.edu

Figure 1: Percent of time used for daily household cooking in three northern Kenyan towns during July and August, 2000. Items cooked included tea, maize (whole grain), maize meal, and all others combined.



- The average daily fuelwood inventory per household was 19 pieces weighing a total of 12 kg. The average weight per piece was almost 1 kg.

- For 16% of 608 daily household observations, households borrowed fuelwood from other households, while a similar number gave fuelwood away. For 10% of observations households had purchased fuelwood, while for 4% of observations households sold fuelwood. For 1% of observations charcoal or other fuel was used for cooking.

- The average household used 19 pieces of wood per day for cooking.[1] The largest number of pieces per day (9) was used for cooking whole-grain maize. The second largest use of wood (6) was for cooking tea. Meals based on maize flour used 3 pieces of wood per day on average, while all other uses accounted for 1 piece per day on average.

- Overall, we find that while 43% of times the stove was used, tea was cooked, the wood used for this purpose only accounts for 27% of total daily fuelwood use. In contrast, although 31% of uses were to cook meals based on unshelled maize, these meals used 40% of fuelwood. Figures one and two contrast measures for the percent of stove use and percent of wood use per site for each of the different types of meals.

- The cooking experiment indicated that cooking an equivalent amount of whole- grain maize required roughly twice (1.97) the wood required to cook ground maize.

Practical Implications

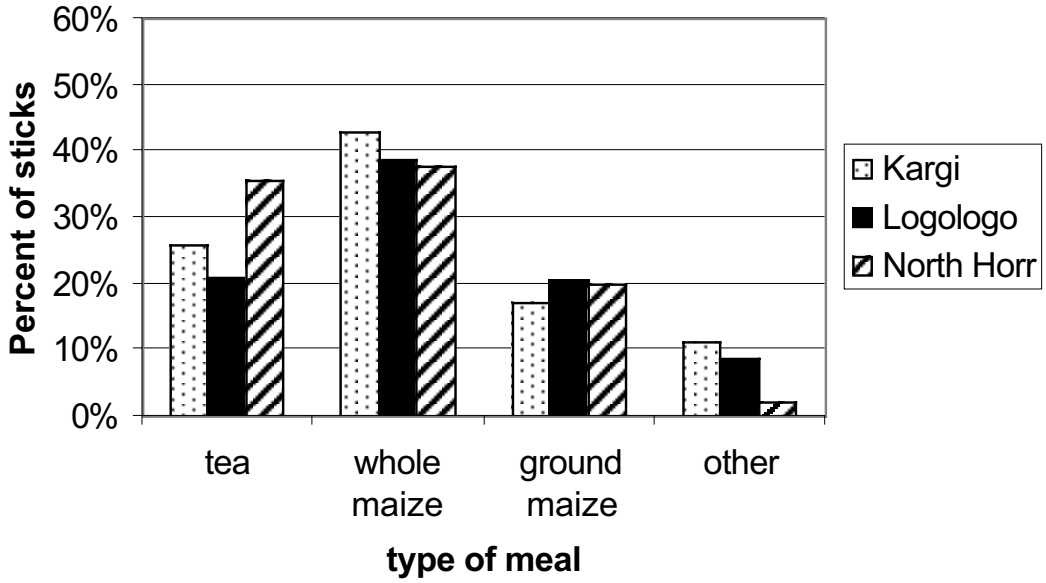
Results are preliminary and will be refined as the analysis proceeds. However, it appears that sedentarization has a two-fold impact on fuelwood resources.

First, pressure is localized on woody resources around towns and settlements. Recall that the average wood gathering trip lasted three hours, and on the return leg the average load carried on a woman's back was in the 40 to 50 kg range. Neither vehicles nor animals played a significant role in fuelwood transport. There is little reason to believe the distance of the collection point from town has changed much from the estimate of 2.5 km forwarded by Walther and Herlocker (1983).

Second, there appears to be a subtler impact brought about by a dietary change from a milk-based to a grain-based diet. The grain-based diet increases fuelwood requirements of households.

These two factors lead to three main practical implications.

Figure 2: Pieces of fuelwood used for daily household cooking in three northern Kenyan towns during July and August, 2000. Items cooked included tea, maize (whole grain), maize meal, and all others combined.



First, we determined that a diet based on whole-grain maize required more fuelwood than one based on ground maize. Recognizing that food aid in this area is distributed as whole grain maize allows us to estimate that a switch in food aid composition from whole-grain to ground maize could reduce fuelwood requirements up to 4% per year and reduce the amount of time women spend gathering fuelwood up to 6%. These figures are estimated by utilizing information in the repeated surveys that record total annual food aid packages received by households and calculating the reduction in wood requirements and use if whole-grain maize had been instead distributed as ground maize. This suggests that food aid distribution in the form of maize flour could reduce both women's labor and mitigate the rate of depletion for woody resources.

Second, more attention should be given to linkages among increased market involvement, dietary change, and higher fuelwood use among settled pastoralists. As pastoralists become increasingly involved in selling livestock and livestock products to purchase grain, pressure on local woody resources can increase. This would occur even in the absence of any increase in human population for a given area, and would be exacerbated where human population growth occurs. While there are some methodological differences in approaches taken, our estimate of household fuelwood use of 19 kg per day is over six times higher than that of Walther and Herlocker's (1983) finding of 2 to 4 kg per day. This suggests that household fuelwood use in northern Kenya has dramatically increased over a 17-year period. We are currently comparing our data with data Walther and Herlocker's (1983) findings and other UNESCO-sponsored research in this area to help understand what may have led to such a rapid increase in fuelwood use by households.

Third, there is reason to question the sustainability of current use patterns. As suggested by Keya (1998), there is evidence that woody resources near pastoral settlements are decreasing due to overuse. Research into efforts to better manage fuelwood is critical, from the demand perspective (improved cooking and food preparation techniques) and the supply perspective (protection of existing woody resources, planting of new woody resources).

Footnote

[1] There is consistency between the results for how many pieces of wood were gathered per week and how many pieces were used per week. Results indicate that households collected or used 131 and 133 pieces per week, respectively.

Further Reading

Fratkin, E. 1991. *Surviving Drought and Development: Ariaal Pastoralists of Northern Kenya.* Boulder: Westview Press.

Keya, G. 1998. "Impact of Land-use Patterns and Climate on the Vegetation Ecology of Arid and Semi-Arid Nomadic Pastoral Ecosystems in Northern Kenya." Ph.D. Dissertation, University of Trier, Germany.

Legesse, A. 1989. Adaptation, Drought, and Development: Boran and Gabra Pastoralists of Northern Kenya. In R. Ashmore and S. Katz (eds.) *African Food Systems in Crisis. Part One: Microperspectives.* New York: Gordon and Breach. 261-280

Lusigi,W. 1984. "Integrated resource assessment and management plan for western Marsabit District, northern Kenya." UNESCO. Nairobi.

McPeak, J. and P. Little. 2002. "Cursed If You Do, Blessed If You Do: The Contradictory Processes of Pastoral Sedentarization in Northern Kenya." Mimeo. Syracuse University.

O'Leary, M. 1987. Changing Responses to Drought in Northern Kenya: the Rendille and Gabra Livestock Producers. In P.W. Baxter (ed.) *Property, Poverty and People: Changing Rights in Property and Problems of Pastoral Development.* Manchester: University of Manchester Dept. of Social Anthropology and International Development Center. 55-69.

Sobania, N. 1979. "Background history of the Mt. Kulal region of Kenya." UNESCO, Nairobi.

Walther, D. and D. Herlocker. (1983). Wood requirements of the Rendille in the Korr area of Marsabit District, Kenya. *Kenyan Geographer* 5: 167-173

About the Author: Dr. John McPeak is an assistant professor in the Departments of Public Administration and Economics at Syracuse University. He can be contacted at 336 Eggers Hall, Syracuse University, Syracuse, NY 13244, USA, or via email at jomcpeak@maxwell.syr.edu

The GL-CRSP Pastoral Risk Management Project (PARIMA) was established in 1997 and conducts research, training, and outreach in an effort to improve welfare of pastoral and agro-pastoral peoples with a focus on northern Kenya and southern Ethiopia. The project is led by Dr. D. Layne Coppock, Utah State University, Email contact: lcoppock@cc.usu.edu.

The Global Livestock CRSP is comprised of multidisciplinary, collaborative projects focused on human nutrition, economic growth, environment and policy related to animal agriculture and linked by a global theme of risk in a changing environment. The program is active in East Africa, Central Asia and Latin America.

This publication was made possible through support provided in part by US Universities, host country institutions and the Office of Agriculture, Economic Growth, Agriculture and Trade Bureau, United States Agency for International Development, under Grant No. PCE-G-00-98-00036-00 to University of California, Davis. The opinions expressed herein are those of the authors and do not necessarily reflect the views of USAID.

Design by Susan L. Johnson